

IN THE CLAIMS

Please cancel original claims 1-7 and add new claims 8-18 as follows:

1-7 (Cancelled)

A2 8. (New) A method for generating a vertical magnetic field in an air gap using one or more magnets, said air gap is used for containing one or more ferrofluid chambers for ferrohydrostatic separation, comprising the steps of:

obtaining a density estimation of the vertical magnetic field based on the ferrohydrostatic separation; and

adjusting the dimensions of said one or more magnets based on said density estimation without changing the air gap.

9. (New) The method of claim 8, further comprising the step of adjusting the configurations of said one or more magnets based on said density estimation.

10. (New) The method of claim 8, wherein one or more of said magnets contains a steel core.

11. (New) The method of claim 8, wherein the step of obtaining further comprising the step of estimating the throughput of the ferrofluid chambers.

12. (New) The method of claim 8, wherein the one or more magnets comprise a C-dipole magnet, an open dipole magnet, or a split pair magnet.

13. (New) The method of claim 12, wherein the step of adjusting further comprises the step of adding or removing fractions of the C-dipole, open dipole, or split pair magnets.

14. (New) The method of claim 12, wherein the step of adjusting further comprises the step of adjusting the length of the poles of the C-dipole, open dipole, or split pair magnets.

15. (New) The method of claim 9 wherein one or more magnets are electromagnets containing magnetizing coils and the step of adjusting the configurations further comprises the step of adjusting the design of the magnetizing coils attached to the poles of the electromagnets.

A₂ 16 (New) The method of claim 8 wherein the vertical magnetic field produces a constant magnetic field gradient.

17 (New) A method of separating materials of different density, comprising the steps of:
generating a vertical magnetic field in an air gap by using one or more magnets, said air gap containing one or more chambers containing ferrofluid,
obtaining a density estimation of the vertical magnetic field based on the ferrohydrostatic separation;
adjusting the dimensions and configurations of said one or more magnets based on said density estimation without changing the air gap;
introducing the materials into one of said chambers containing ferrofluid; and
separately recovering materials from different locations in the ferrofluid.

18 (New) A system for separating materials having different densities, comprising:
one or more magnets, said one or more magnets generating a vertical magnetic field in an air gap, said air gap further containing one or more ferrofluid chambers,
wherein the density of said vertical magnetic field is controlled by adjusting the dimensions and configurations of said one or more magnets without changing the air gap.